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International Space Station Medical Operations Book

ISS-Expedition 1

Mission Operations Directorate
Operations Division

Preliminary
March 11, 1998

These procedures are available electronically on the SODF Homepage at http://fltproc.jsc.nasa.gov

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
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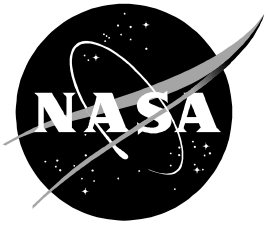

USA
United Space Alliance

INTERNATIONAL SPACE STATION MEDICAL OPERATIONS BOOK ISS-EXPEDITION 1

PRELIMINARY
March 11, 1998

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This document is not currently under the configuration control of the Systems Operations Data File Control Board (SODFCB). During the interim, changes may be submitted to the book manager.

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CONTENTS

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ACTIVATION AND CHECKOUT

A&C

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NOMINAL

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MEC SETUP

1. UNSTOW MEC

TVIS Support Pack
MEC - Thinkpad
DC PWR SPLY
DC PWR cable
DC PWR SPLY cable
ORB 1553 Data Cable

2. √PWR OFF

PWR SPLY
√DC PWR SPLY PWR sw1 - Off

Refer to UTILITY OUTLET PLUG-IN PLAN ORBIT CONFIGURATION (FDF REF DATA FS, UTIL PWR) for DC UTIL PWR outlet availability.

TBD
√DC UTIL PWR - Off

3. MAKE MEC PWR AND DATA CABLE CONNECTIONS

√1553 PC Card, Adapter Cable inserted in PC slot

Connect DC PWR SPLY cable to MEC DC PWR outlet
DC PWR SPLY outlet (J2)

PDIP
Connect Orb DC PWR SPLY cable to DC UTIL PWR outlet
DC PWR SPLY outlet (J1)

Connect Orb 1553 Data cable to TBD PDIP Data Port outlet
1553 PC Card Adapter Cable

4. TURN ON MEC

TBD
DC UTIL PWR → On

PWR SPLY
DC PWR SPLY PWR sw1 → On (lt on)

> NOTE
> Let MEC cycle through the initialization screens without any keystroke inputs. System boot takes 3 to 4 minutes.

MEC
MEC Thinkpad PWR sw → On

MEC DEACTIVATION

1. POWER DOWN MEC
   At the Taskbar on bottom of display
   sel START/SHUT DOWN

   On 'Logout Confirmation' window
   sel OK

MEC — MEC Thinkpad PWR sw → Off

PWR SPLY — DC PWR SPLY PWR sw1 → Off (lt off)

TBD — DC UTIL PWR → Off

2. DISCONNECT MEC PWR AND DATA CABLE

PDIP — Disconnect Orb 1553 Data cable to TBD PDIP Data Port outlet
1553 PC Card Adapter Cable

Disconnect Orb DC PWR SPLY cable to DC UTIL PWR outlet
DC PWR SPLY outlet (J1)

Disconnect DC PWR SPLY cable to MEC DC PWR outlet
DC PWR SPLY outlet (J2)

POTABLE WATER COLLECTION (WMK/WS&A)

NOTE
Water collection will be taken from three locations for Chemical and Micro: SVO-ZV, Galley hot water tap, and Galley cold water tap.

1. Unstow
   ISS Potable Water Collection Subpack (WS&A) (one)
   Sharpie Pen (WS&A/WMK)
   WMK

NOTE
1. SVO-ZV: The hand-pump may be used to provide sufficient pressure to permit water sample collection. There is no device for accurate SVO-ZV water amount measurement. Crewmember will be required to perform visual estimation of 25 mL of flush water and 100 mL and 200 mL samples. 2. Galley water: Turn Galley heater on before collecting water samples. Start sampling only after heating cycle is completed. Each heating cycle requires 30 minutes for pasteurization of 525 mL of water. One delivery = 25 mL.

2. Wipe appropriate tap (Galley or SVO-ZV) with disinfectant wipe.
   Discard wipe.

3. Remove water sampler from protective package.
   Place sampler package in WS&A.

WARNING
1. To avoid contamination, do not touch Galley (SVO-ZV) tap.
2. Hold sampler by middle only.

4. Put water sampler on Galley (SVO-ZV) tap.

5. ATTACH WASTE WATER BAG
   Remove protective cover from Waste Water Bag connection.
   Connect the Waste Water Bag to sampler.
   Attach Waste Water Bag connection ↷.

6. COLLECT WATER INTO WASTE WATER (FLUSH) BAG

Galley (hot or cold)	SVO-ZV
Sw water portion in mL → Continuous DELIVERY Valve → Open PRESS WATER SUPPLY pb → On Place 25 mL of water (one delivery) into Waste Water Bag (1/12 full). DELIVERY Valve → Close (after each portion collection)	Place 25 mL of water into Waste Water Bag (1/12 full).

> NOTE
> Do not remove Waste Water Bag until ready to connect TOC Water Sample Bag or Syringe.

7. If TOC Syringe Sample required, go to step 51.

8. Unstow TOC Water Sample Bag and particulate filter from Subpack.

9. Record date, time, and sampling location on TOC Water Sample Bag Label using Sharpie Pen.

10. REMOVE WASTE WATER BAG
    Remove Waste Water Bag connection ↶.
    Remove Waste Water Bag from sampler.
    Replace protective cover onto Waste Water Bag connection.
    Place the Waste Water Bag into the Ziploc Bag in Subpack (WS&A).

11. ATTACH TOC WATER SAMPLE BAG TO SAMPLER CONNECTION
    Remove protective cover from TOC Water Sample Bag connection.
    Connect TOC Water Sample Bag to particulate filter.
    Attach TOC Water Sample Bag connection ↷.

> NOTE
> Do not overfill bag. Overfilled bag may cause leakage.

12. COLLECT WATER INTO TOC WATER SAMPLE BAG

Galley (hot or cold)	SVO-ZV
Sw water portion in mL → Continuous DELIVERY Valve → Open PRESS WATER SUPPLY pb → On Place 100 mL of water (four deliveries) into Water Sample Bag (1/3 full). DELIVERY Valve → Close (after each portion collection)	Place 100 mL of water into Water Sample Bag (1/3 full).

13. Remove Micro Sample Bag/Micro Water Archival Bag (for ground analysis) from WMK.
Record date and circle sampling location (Galley hot, Galley cold, SVO-ZV) on Bag using Sharpie Pen.

> NOTE
> Do not remove TOC Water Sample Bag until ready to connect Micro Sample Bag.

14. REMOVE TOC WATER SAMPLE BAG FROM SAMPLER
Remove TOC Water Sample Bag connection ↶.
Place protective cover on Water Sample Bag connection.

15. Disconnect cap from Micro Sample Bag.
Connect Micro Sample Bag to water sampler.

16. Place TOC Water Sample Bag into Ziploc Bag.
Tmpry stow Sample Bag in TBD.

17. Collect 300 mL of water in Micro Sample Bag (Galley hot, Galley cold, SVO-ZV).

18. COLLECT ARCHIVE COLLECTION
If only Chemical Archive Collection is required
  Perform steps 19 --- 28

If Chemical and Micro Archive Collection is required
  Perform steps 29 --- 44

If no Archive Collection is required

> NOTE
> Do not remove Micro Sample Bag until ready to connect Waste Water Bag.

1. Remove Micro Sample Bag from water sampler.
2. Recap Micro Sample Bag.
3. Repeat steps 2, 5 --- 18 for Chemical and Micro (hot, cold, and SVO-ZV).
4. Remove sampler from Galley (SVO-ZV) tap.
5. Place sampler into Ziploc Bag.
6. Place Ziploc in Subpack in WS&A.
7. Stow WS&A.

NOTE
Do not remove Micro Sample Bag until ready to connect Chemical Archive Bag.

19. Unstow Chemical Archive Bag.

    Record date, time, and sampling loaction on Chemical Archive Bag Label using Sharpie Pen.

20. REMOVE MICRO SAMPLE BAG
    Disconnect Micro Sample Bag.
    Recap Micro Sample Bag and tmpry stow in WMK.

21. ATTACH CHEMICAL ARCHIVE BAG
    Remove protective cover from Chemical Archive Sample Bag connection.
    Connect Bag to sampler connection.
    Attach Bag connection ↷.

NOTE
Do not overfill bag. Overfilled bag may cause leakage.

22. COLLECT WATER INTO CHEMICAL ARCHIVE BAG

Galley (hot or cold)	SVO-ZV
Sw water portion in mL → Continuous DELIVERY Valve → Open PRESS WATER SUPPLY pb → On Place 750 mL of water (30 deliveries) into Water Archive Bag (3/4 full). DELIVERY Valve → Close (after each portion collection)	Place 750 mL of water into Water Archive Bag (3/4 full).

NOTE
Do not remove Chemical Archive Bag until ready to connect Waste Water Bag.

23. REMOVE CHEMICAL ARCHIVE BAG
    Remove Chemical Archive Bag connection ↶.
    Place protective cover on Water Sample Bag connection.

24. Repeat steps 2, 5 --- 23 for Chemical and Micro (Galley hot, Galley cold, SVO-ZV).

25. Remove sampler from Galley (SVO-ZV) tap.

26. Place sampler into Ziploc Bag.
    Place in Subpack.

27. Place Subpack into WS&A.

28. Stow WS&A.

29. Perform steps 30 --- 44 only if Chemical and Micro Archive Collection are required.

NOTE
Do not remove Micro Sample Bag until ready to connect Chemical Archive Bag.

30. Unstow Chemical Archive Bag.

    Record date, time, and sampling loaction on Chemical Archive Bag Label using Sharpie Pen.

31. REMOVE MICRO SAMPLE BAG
    Disconnect Micro Sample Bag.
    Recap Micro Sample Bag.
    Tmpry stow Bag in WMK.

32. ATTACH CHEMICAL ARCHIVE BAG
    Remove protective cover from Chemical Archive Sample Bag connection.
    Connect Bag to sampler connection.
    Attach Bag connection ↷.

NOTE
Do not overfill bag. Overfilled bag may cause leakage.

33. COLLECT WATER INTO CHEMICAL ARCHIVE BAG

Galley (hot or cold)	SVO-ZV
Sw water portion in mL → Continuous DELIVERY Valve → Open PRESS WATER SUPPLY pb → On Place 750 mL of water (30 deliveries) into Water Archive Bag (3/4 full). DELIVERY Valve → Close (after each portion collection)	Place 750 mL of water into Water Archive Bag (3/4 full).

34. Unstow Micro Archive Bag from WMK.

    Record date and circle sampling location (hot, cold, SVO-ZV) on Bag using Sharpie Pen.

35. REMOVE CHEMICAL ARCHIVE BAG
    Remove Chemical Archive Bag connection ↶.
    Place protective cover on Chemical Archive Bag connection.

36. Disconnect cap from Micro Archive Bag.
    Connect Micro Archive Bag to water sampler.

37. Place Chemical Archive Bag into Ziploc Bag.
    Tmpry stow Archive Sample in TBD.

38. Collect 1000 mL of water in Micro Archive Bag (Galley hot, Galley cold, SVO-ZV).

    NOTE
    Do not remove Micro Archive Bag until ready to connect Waste Water Bag.

39. REMOVE MICRO ARCHIVE BAG
    Disconnect Micro Archive Bag.
    Recap Micro Archive Bag.
    Tmpry stow Bag in WMK.

40. Repeat steps 2, 5 --- 39 for Chemical and Micro (hot, cold, and SVO-ZV).

41. Remove sampler from Galley (SVO-ZV) tap.

42. Place sampler into Ziploc Bag.
    Place in Subpack.

43. Place Subpack into WS&A.

44. Stow WS&A.

> NOTE
> Do not perform steps 51 --- 90 unless instructed to take In-Flight Chemical Sample with TOC Sample Syringe.

51. Unstow TOC Sample Syringe with particulate filter from Subpack.

52. Record date, time, and sampling location on TOC Sample Syringe Label using Sharpie Pen.

> NOTE
> Do not remove Waste Water Bag until ready to connect TOC Sample Syringe.

53. REMOVE WASTE WATER BAG
Remove Waste Water Bag connection ↶.
Remove Waste Water Bag from sampler.
Replace protective cover onto Waste Water Bag connection.
Place the Waste Water Bag into the Ziploc Bag in Subpack (WS&A).

54. ATTACH TOC SAMPLE SYRINGE TO SAMPLER CONNECTION
Attach syringe with particulate filter to sampler connection.
Attach particulate filter connection ↷.
√Connection is tight

55. OPEN SYRINGE SHUT-OFF VLV

> NOTE
> Plunger is designed so that it cannot be withdrawn beyond 25 mL mark. Do not underfill syringe.

Turn valve to position that is parallel to flow direction.

56. COLLECT WATER INTO TOC SAMPLE SYRINGE

Galley (hot or cold)	SVO-ZV
Sw water portion in mL → Continuous DELIVERY Valve → Open PRESS WATER SUPPLY pb → On Place 25 mL of water (one delivery) into TOC Water Sample Syringe. DELIVERY Valve → Close (after each portion collection)	Place 25 mL of water into TOC Sample Syringe.

57. CLOSE SYRINGE SHUT-OFF VLV
Turn valve perpendicular to flow direction.

58. Remove Micro Sample Bag from WMK.
Record date and circle sampling location (Galley hot, Galley cold, SVO-ZV) on Bag using Sharpie Pen.

> NOTE
> Do not remove Sample Syringe until ready to connect Micro Sample Bag.

59. Remove Sample Syringe with particulate filter from sampler connection ↶.

60. Disconnect cap from Micro Sample Bag.
Connect Micro Sample Bag to water sampler.

61. Remove particulate filter from syringe.
Place filter into Ziploc Bag.
Tmpry stow filter in WS&A.

62. Place protective cover on syringe.
Place syringe into Ziploc Bag.
Tmpry stow in WS&A.

63. Collect 300 mL of water in Micro Sample Bag (Galley hot, Galley cold, SVO-ZV).

64. COLLECT ARCHIVE COLLECTION
If only Chemical Archive Collection is required
  Perform steps 65 --- 74

If Chemical and Micro Archive Collection is required
  Perform steps 75 --- 90

If no Archive Collection is required

> NOTE
> Do not remove Micro Sample Bag until ready to connect Waste Water Bag.

1. Remove Micro Sample Bag from water sampler.
2. Recap Micro Sample Bag.
   Tmpry stow Bag in WMK.
3. Repeat steps 2, 5 --- 64 for Chemical and Micro (hot, cold, and SVO-ZV)
4. Remove sampler from Galley (SVO-ZV) tap.
5. Place sampler into Ziploc Bag in Subpack in WS&A.
6. Stow WS&A.

NOTE
Do not remove Micro Sample Bag until ready to connect Chemical Archive Bag.

65. Unstow Chemical Archive Bag.
Record date, time, and sampling loaction on Chemical Archive Bag Label using Sharpie Pen.

66. REMOVE MICRO SAMPLE BAG
Disconnect Micro Sample Bag.
Recap Micro Sample Bag.
Tmpry stow Bag in WMK.

67. ATTACH CHEMICAL ARCHIVE BAG
Remove protective cover from Chemical Archive Bag connection.
Connect Bag to sampler connection.
Attach Bag connection ↷.

NOTE
Do not overfill bag. Overfilled bag may cause leakage.

68. COLLECT WATER INTO CHEMICAL ARCHIVE BAG

Galley (hot or cold)	SVO-ZV
Sw water portion in mL → Continuous DELIVERY Valve → Open PRESS WATER SUPPLY pb → On Place 750 mL of water (30 deliveries) into Water Archive Bag (3/4 full). DELIVERY Valve → Close (after each portion collection)	Place 750 mL of water into Water Archive Bag (3/4 full).

NOTE
Do not remove Chemical Archive Bag until ready to connect Waste Water Bag.

69. REMOVE CHEMICAL ARCHIVE BAG
Remove Chemical Archive Bag connection ↶.
Place protective cover on Water Sample Bag connection.

70. Repeat steps 2, 5 --- 69 for Chemical and Micro (Galley hot, Galley cold, SVO-ZV).

71. Remove sampler from Galley (SVO-ZV) tap.

72. Place sampler into Ziploc Bag.
Place in Subpack.

73. Place Subpack into WS&A.

74. Stow WS&A.

75. Perform steps 76 --- 90 only if Chemical and Micro Archive Collection are required.

NOTE
Do not remove Micro Sample Bag until ready to connect Chemical Archive Bag.

76. Unstow Chemical Archive Bag.
Record date, time, and sampling loaction on Chemical Archive Bag Label using Sharpie Pen.

77. REMOVE MICRO SAMPLE BAG
Disconnect Micro Sample Bag.
Recap Micro Sample Bag and tmpry stow in WMK.

78. ATTACH CHEMICAL ARCHIVE BAG
Remove protective cover from Chemical Archive Bag connection.
Connect Bag to sampler connection.
Attach Bag connection ↷.

NOTE
Do not overfill bag. Overfilled bag may cause leakage.

79. COLLECT WATER INTO CHEMICAL ARCHIVE BAG

Galley (hot or cold)	SVO-ZV
Sw water portion in mL → Continuous DELIVERY Valve → Open PRESS WATER SUPPLY pb → On Place 750 mL of water (30 deliveries) into Water Archive Bag (3/4 full). DELIVERY Valve → Close (after each portion collection)	Place 750 mL of water into Water Archive Bag (3/4 full).

80. Unstow Micro Archive Bag from WMK.
Record date and circle sampling location (hot, cold, SVO-ZV) on Bag using Sharpie Pen.

81. REMOVE CHEMICAL ARCHIVE BAG
    Remove Chemical Archive Bag connection ↶.
    Place protective cover on Chemical Archive Bag connection.

82. Disconnect cap from Micro Archive Bag.
    Connect Micro Archive Bag to water sampler.

83. Place Chemical Archive Bag into Ziploc Bag.
    Tmpry stow Archive Sample Bag in TBD.

84. Collect 1000 mL of water in Micro Archive Bag (hot, cold, SVO-ZV).

NOTE
Do not remove Micro Archive Bag until ready to connect Waste Water Bag.

85. REMOVE MICRO ARCHIVE BAG
    Disconnect Micro Archive Bag.
    Recap Micro Archive Bag.
    Tmpry stow Bag in WMK.

86. Repeat steps 2, 5 --- 85 for Chemical and Micro (hot, cold, and SVO-ZV).

87. Remove sampler from Galley (SVO-ZV) tap.

88. Place sampler into Ziploc Bag.
    Place in Subpack.

89. Place Subpack into WS&A.

90. Stow WS&A.

SSK - SAMPLE COLLECTION/INCUBATION

TBD

1. Unstow SSK Kit.

2. Transport Kit to sampling location.

3. Remove one SSPA and Scissors from Kit and cut top edge to open. Stow Scissors in Kit.

4. Remove TSA Slide (enclosed in protective sleeve) designated by white dot and stow remainder of SSPA in outside Kit pocket.

> NOTE
> Do not touch exposed Media Slide with fingers or any object before sampling. If Slide is contaminated when removed from protective sleeve, discard in Ziploc Bag and replace with another SSPA.

5. Remove TSA Media Slide from protective sleeve

   Grasp labeled end of protective sleeve with one hand, slide the sleeve seal to opposite end of protective sleeve.

   Grasp corner of labeled end of protective sleeve and open the cover by pulling it back no further than the middle of Media Slide.

   Remove Media Slide from protective sleeve by holding the edge and pulling the slide out with the agar surface facing away from body.

   Close protective sleeve by sliding sleeve seal back in place.

6. Secure empty protective sleeve in outside pocket of Kit.

7. To sample flat surface, firmly but gently press TSA Media Slide onto surface area and hold for 1 or 2 seconds.

8. To sample non-flat area, remove swab tube with white dot from Kit and remove swab moistened with sterile phosphate buffer from tube. Secure buffer tube in outside pocket of Kit.

   Using moistened swab, sample a 25 cm^2 area by rolling the swab across entire surface area.

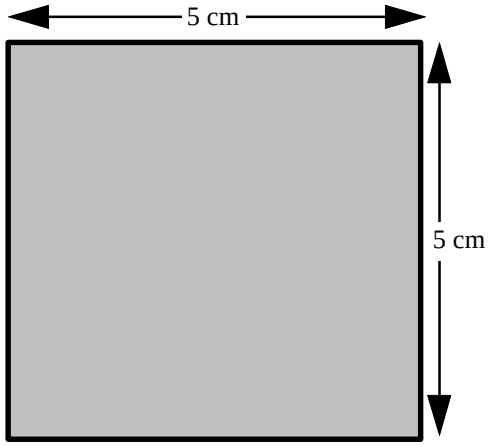

Figure 1.- Flat surface sample area.

After sample is taken, inoculate the Media Slide by rolling the swab across media surface four times from end to end.

Reinsert the used swab into the tube.
Discard tube and swab as biohazardous trash.

9. Remove protective sleeve from pocket.
   Replace Media Slide in protective sleeve.
   Slide sleeve seal back to labeled end of protective cover to secure cover.

10. Record the date, time, and location on affixed label.

11. Enclose inoculated Media Slide in the Ziploc Bag with white dot for incubation.

12. Repeat steps 4 --- 11 using the Media Slide with the red dot, the swab with the red dot, and the Ziploc Bag with red dot.

13. Clean the area sampled with a disinfectant wipe from the SSPA.

14. Discard the disinfectant wipe and the SSPA wrap in trash.

15. Repeat steps 2 --- 14 for each sampling site of habitable modules.

16. Place the Ziploc Bags with the inoculated Media Slides in a warm place for incubation or replace in the Nomex Kit for incubation.

SSK - VISUAL ANALYSIS AND DIGITAL PHOTOGRAPHY

1. At two days and five days after incubation, use one of the options below to examine the inoculated media slides for microbial growth.

   If necessary, the slide may be removed from the Ziploc Bag.

   1. Option 1 - preferred
      Count number of colonies on each contact slide and report results as number of colony forming units (CFU) per 25 cm^2.

   2. Option 2
      Remove density chart #1 from the SSK for contact slides with white dot and #2 for contact slides with red dot.

      Observe the growth on each Media Slide.
      Compare the amount of growth on each slide to the pictures on the appropriate density chart.

      Match the growth pattern to one on the density chart and assign the corresponding number as follows:
      Slides with white dot, assign 1 --- 4.
      Slides with red dot and showing smooth texture colonies, assign A, B, or C.
      For fuzzy or filamentous growth, assign D or E.

2. Record results on data sheet for entry on MEC.
   √**MCC**

3. Photograph growth results using a Digital Camera such that the entire agar surface of slide and protective cover is in view finder.

4. Return Media Slides to Biohazard Bag.
   Stow Bag in incubation location after day two analysis and in Kit as biohazard trash after day five analysis.

5. Stow SSK and Digital Camera.

SSK/WMK - DATA ENTRY

Data results will be manually entered into the MEC according to TBD procedure and TBD schedule.

TOCA - WATER SAMPLE ANALYSIS

1. Unstow
   TOC Supply Kit
   TOC Analyzer
   WS&A

2. Remove Log Book and Washcloth from TOC Supply Kit.
   Tmpry stow Washcloth near TOCA.

3. Unstow power cable from TOC Supply Kit.

TOC Front Panel

4. √POWER switch - Off

5. Power cable →|← TOC Analyzer connection marked "27.5 VDC"
   Power cable →|← ISS electrical connector

TOC Front Panel

6. POWER switch → On

TOC Front Panel

7. √DISPLAY ORIENTATION screen

8. Select 'ORIENTATION' (picture on the screen normal or upside down) (keys "↑" "↓").
   Press <ENTER>

9. Select 'ANALYZE' from 'Main menu' screen (keys "↑" "↓").
   Press <ENTER> to access Analysis menu.

10. Choose <From Syringe> or <From Bag>
    Press <ENTER>

11. If "From Bag" is selected, go to step 29.

12. Turn TOCA fastener door ↶.
    Door → Down
    Opens sample syringe-pump access compartment.
    Secure door to Velcro strip.

NOTE
Perform analysis in following order Galley cold Galley hot SVO-ZV

13. Unstow filled TOC Water Sample Syringe from WS&A.
    Record location, date, and time of sample collection from Syringe Label in Log Book.

14. Connect Syringe to syringe-pump.

> NOTE
> Press Syringe to confirm that syringe connection is tight and no leaks occur.

15. OPEN SHUT-OFF VLV ON SYRINGE
    Turn valve parallel to flow direction.

16. Press on plunger for 3 seconds.
    √No leaks at connection

17. Pivot Sample Syringe through access opening on syringe-pump.

18. Close door on sample syringe-pump access area.
    Turn door fastener ↷.

:00:00 19. Press <ENTER> to initiate analysis.
    Wait for 1 minute to check for error messages.
    If error messages, see TOCA Cue Cards.

:30:00 20. √Analysis is completed
    √Data shows on display

21. Note sample number, time, and date of analysis, and results of total organic carbon (TOC), total inorganic carbon (TIC), total carbon (TC), pH, and conductivity (COND) from display.
    Record this information in TOC Log Book.

22. Open door on sample syringe-pump access area.
    Turn door fastener ↶.

23. Group syringe plunger and pivot out 60° (toward user).

24. CLOSE SHUT-OFF VLV ON SYRINGE
    Turn valve perpendicular to flow direction.

25. Disassemble Luer Lock fitting.
    Disconnect Syringe from syringe-pump.

26. Attach protective cover to female fitting connection of Syringe.

27. Stow in TOC Supply Kit
    Place Syringe in Ziploc Bag and place into Subpack in Kit.
    Stow TOC Test Sample Syringe in Ziploc Bag and place in Kit.

28. Go to step 42.

29. Turn fastener on TOC door ↶.
    Door → Down
    Opens sample syringe-pump access compartment.
    Secure door to Velcro strip.

NOTE
Perform sample analysis in following order, whenever possible Galley cold Galley hot SVO-ZV

30. Connect empty Syringe to syringe-pump.

OPEN SHUT-OFF VLV ON SYRINGE

31. Turn valve parallel to flow direction.

32. Pivot Sample Syringe through access opening on syringe-pump.

33. Shut sample door.
    Turn door fastener ↷.
    Press <ENTER>

NOTE
Pressing <CLEAR> backs up to the prior menu.

34. Open sample door.
    Turn door fastener ↶.
    Clamp syringe handle.

35. Shut sample door.
    Turn door fastener ↷.

36. Attach Sample Bag.
    Press <ENTER>

:00:00 37. Press <ENTER> to initiate analysis.
    Wait 1 minute to check for error messages.
    If error messages, see TOCA Cue Cards.

NOTE
Pressing <CLEAR> backs up to the initial menu.

:60:00 38. √Analysis is completed
√Data shows on display

39. Note sample number, time, and date of analysis, and results of total organic carbon (TOC), total inorganic carbon (TIC), total carbon (TC), pH, and conductivity (COND) from display.

Record this information in Log Book.

40. Remove Sample Bag.
Open sample door.
Turn door fastener ↶.

41. Release syringe handle.
Shut sample door.
Turn door fastener ↷.
Press <ENTER>

42. Repeat steps 9 --- 41 for all remaining analyses.

NOTE
Perform step 43 if no waste water container replacement scheduled.

43. After all samples have been analyzed
Close door.
Turn fastener on TOC door ↷.
TOC POWER switch → Off
Front Panel J8 switch → Off
DC8
Power cable ←|→ ISS electrical connector
Detach power cable from front panel.
Power cable → TOC Supply Kit

44. Stow
TOC Analyzer
TOC Supply Kit

45. Report to **MCC**: date, time of sample collection, and analysis results for each sample analyzed.

TOCA - WASTE CONTAINER REPLACEMENT

NOTE
Waste container should not be replaced while analyzer is performing an analysis. Analyzer will lose power automatically when the clear plastic cover over waste container is removed. Loss of analysis data will occur if Analyzer is unpowered during the analysis.

1. Unstow from TOC Supply Kit
   Waste Container Subpack (one)
   Washcloth (one)
   Ziploc Bags (two)

TOC Front Panel

2. √TOCA POWER switch - Off
   J8 switch → Off
   DC8

3. Verify through plastic cover on top of analyzer for any sign of liquid outside of waste water container.

Right Top of TOC

4. OPEN WASTE STORAGE AREA
   Loosen thumb screws (six).
   Remove clear plastic cover marked “Waste.”
   Tmpry stow plastic cover on top of analyzer using Velcro.

CAUTION
Be careful! To prevent damage to tube with liquid, do not pull hard on container.

5. REMOVE WASTE CONTAINER FROM TOC ANALYZER
   Place a Washcloth over QD fitting.
   Disconnect waste container from TOCA with QD.

6. Retrieve new waste container from Waste Container Subpack.

7. Place used container into Waste Container Subpack.
   Label Subpack “Used.”
   Place Subpack with used waste container into Ziploc Bag and into TOC Supply Kit.

8. ATTACH NEW WASTE CONTAINER AND CHECK FOR LEAK
   Connect new waste container connector to QD.
   √Liquid line is not kinked
   Close QD upstream and downstream shut-off valves (to the right and left of the QD).
   Slide syringe pin or container to first stop position.
   Pin may not move if good seal established.

√QD for leaks

If QD leaks
- Collect liquid with Washcloth.
- Disconnect QD.
- Reconnect QD.
- Rotate syringe pin and slide to second stop position.
- Pin may not move if good seal is established.
- √QD for leaks

If QD leaks
- Waste container is unusable.
- Retrieve another waste container from Waste Container Subpack and repeat step 8.

If QD does not leak, go to step 9.

9. Replace clear plastic cover marked “Waste.”
   Tighten thumb screws (six).
   Place used Washcloth into Ziploc Bag and into Kit.

TOC Front Panel

10. TOCA POWER switch → On

NOTE
If no power to screen, √plastic cover is closed.

11. √Display Orientation screen
    Press <ENTER>

12. Select ‘ORIENTATION’ (picture on the screen normal or upside down) (keys “↑” “↓”).
    Press <ENTER>

13. Select ‘Service’ from ‘Main Menu’ screen (keys “↑” “↓”).
    Press <ENTER>

14. Select ‘Waste’ from ‘Service’ screen (keys “↑” “↓”).

15. Select ‘Replaced’ from ‘Waste Container’ screen (keys “↑” “↓”).
    Press <ENTER>

16. √‘Waste Replacement’ screen
    Press <ENTER>

17. √Display shows current date and waste count on display shows 0 to 10

TOC 18. TOCA POWER switch → Off
Front Panel J8 switch → Off
DC8

19. Power cable ←|→ ISS electrical connector
Remove power cable from front panel.
Cable → TOC Supply Kit

20. Stow
TOC Analyzer
TOC Supply Kit

21. Report to **MCC**, “Waste container replaced.”

TOCA - REAGENT MIXING

NOTE
Analyzer is automatically unpowered when plastic cover over reagent area is removed. Analyzer will lose data for current analysis if it is unpowered during an analysis.

1. Unstow
   TOC Supply Kit
   TOC Analyzer
   Power cable ← TOC Supply Kit

TOC Front Panel

2. √POWER switch - Off

3. Power cable →|← TOC Analyzer Connection marked “27.5 VDC”
   Power cable →|← ISS electrical connector

4. Look through clear plastic cover on side of TOC Analyzer for any sign of liquid outside of reagents container.

WARNING
1. If liquid is seen outside reagents container, do not remove clear plastic cover and do not use analyzer further. Notify **MCC** and await instruction.
2. If liquid is seen inside reagents container (routine condensation), proceed.

5. <u>REMOVE PLASTIC COVER</u>
   Loosen thumb screws (six).
   Remove clear plastic cover marked “Reagents.”
   Tmpry stow plastic cover on Velcro.

6. <u>POSITION VALVES</u>
   Locate mixing valve positioned at “Analyze.”
   Turn valve from “Analyze” position to “Store” position.

   Locate next mixing valve positioned at "Store" (located to the right of mixing valve positioned at “Analyze”).
   Turn valve from “Store” position to “Mix” position.

NOTE
During mixing of a new oxidizer solution, plunger of mixing syringe will move very slowly as plunger is manually pressed or pulled back. Constant force should be applied without attempting to force speed of plunger movement.

7. MIX SOLUTION
   Locate plunger corresponding to valve in “Mix” position.
   Push plunger in completely with constant force.
   Pull plunger out completely with same force to mix solution.
   Wait 2 minutes.
   Push plunger in completely one more time.

CAUTION
While mixing reagents, make sure that plunger is pushed in completely.

8. Locate mixing valve positioned at “Mix” position.
   Turn valve from “Mix” position to “Analyze” position.

9. REPLACE CLEAR PLASTIC COVER
   Tighten thumb screws (six).

TOC Front Panel

10. POWER switch → On

11. √Display Orientation screen
    Press <ENTER>

NOTE
If no power to screen, √plastic cover is closed.

12. Select ‘ORIENTATION’ (picture on the screen normal or upside down) (keys “↑” “↓”).
    Press <ENTER>

13. Select ‘Service’ from ‘Main Menu’ screen (keys “↑” “↓”).
    Press <ENTER>

14. Select ‘Reagents’ from ‘Service’ screen (keys “↑” “↓”).

15. Select ‘Mixed’ from ‘Reagents’ screen (keys “↑” “↓”).
    Press <ENTER>

16. PREPARE SYRINGE TO FLUSH PURGE LINE
Unstow syringe with deionized water from TOC Supply Kit.
Remove protective cap and plunger stopper from syringe.
√Syringe shut-off vlv - Close
Connect syringe to syringe-pump.

NOTE
Press syringe to confirm that syringe connection is tight and no leaks occur.

Open shut-off valve on syringe.
Turn valve parallel to flow direction.

17. Press on plunger for three seconds.
√No leaks at connection

18. Pivot sample syringe through access opening on syringe-pump.

19. CLOSE SAMPLE SYRINGE-PUMP ACCESS AREA
Turn door fastener ↷.

20. Press <ENTER> on “Reagents Mixed” screen to reset reagent mixing date and begin to purge line.
:00:00 Countdown clock for flushing begins.

:25:00 21. √‘Mixed Date’ on Reagents Mixed screen is current date
√Reagent batch number
√Sample number 3 of 32
Press <CLEAR>

NOTE
Wait at least 30 minutes after mixing for oxidizer crystals to dissolve completely before performing an analysis.

TOC 22. POWER switch → Off
Front Panel J8 switch → Off
PUP-A DC8

23. Power cable ←|→ ISS electrical connector
Remove power cable from the front panel.
Cable → TOC Supply Kit

24. Stow
TOC Analyzer
TOC Supply Kit

TOCA - RAM DATA CARD REPLACEMENT

CAUTION
Do not replace the RAM data card while the analyzer is performing an analysis or current data will be lost. Analysis must be completed prior to replacement of the RAM card to prevent data loss.

1. POWER switch → Off

2. ACCESS RAM CARD
   Locate cover on top surface of Analyzer marked RAM CARD.
   Turn thumb screws (two) on cover CCW to unlock ↶.
   Tmpry stow cover using Velcro on top of Analyzer.

3. REMOVE USED RAM CARD
   Depress button next to RAM Card to unlock Card.
   Using index finger and thumb, grip RAM Card by top edge.
   Lift RAM Card out of slot and remove from Analyzer.

4. Unstow new TOC RAM Data Card Subpack (TOC Supply Kit).

5. Remove new TOC RAM Card from Subpack case.
   Place used RAM Card into Subpack case and stow (TOC Supply Kit).

6. INSTALL NEW RAM CARD
   Align RAM Card with card guides in slot with label facing left.
   Slide Ram Card down into slot until it locks and is firmly seated in TOC Analyzer.

7. CLOSE RAM CARD COVER
   Lock down by turning thumb screws (two) on cover clockwise until hand-tight.

8. POWER switch → On

9. √DISPLAY ON ANALYZER FRONT PANEL

```
**********************************************************************
*  If display not illuminated                                        *
*  |   √RAM CARD cover fully closed and locked down snugly           *
*  |   If Display Orientation menu is displayed, proceed to step 11. *
*  |                                                                 *
*  If display shows error message, 'RAM card not installed...' or    *
*  'RAM card write-protected...', refer to TOCA Cue Cards.           *
**********************************************************************
```

10. POWER switch → Off

11. Inform **MCC** upon completion, brief any problems.

12. Stow TOC Supply Kit and TOC Analyzer.

TOCA - CALIBRATION

1. Unstow
   TOC Supply Kit
   TOC Analyzer

2. Remove Washcloth from TOC Supply Kit.
   Tmpry stow Washcloth near TOC.

3. Unstow power cable ← TOC Supply Kit

TOC Front Panel

4. √POWER switch - Off

5. Power cable →|← TOC Analyzer connection marked “27.5 VDC”
   Power cable →|← ISS electrical connector

PUP-A

6. J8 switch → ON
   DC8

TOC Front Panel

   POWER switch → ON

TOC Front Panel

7. √DISPLAY ORIENTATION screen
   Press <ENTER>

8. Select ‘ORIENTATION’ (picture on the screen normal or upside down) (keys “↑” “↓”).
   Press <ENTER>

9. Select ‘CALIBRATION’ from ‘Main menu’ screen (keys “↑” “↓”).
   Press <ENTER> to access CALIBRATION menu.

10. Choose <Syringe>
    Press <ENTER>

11. Turn fastener on TOC door ↶.
    Door → Down
    Opens sample syringe-pump access compartment.
    Secure door to Velcro strip.

NOTE
Perform analysis in following order Syringe A Syringe B

13. Unstow ground-prepared Syringes A and B from Subpack.
    Record Syringe ID letter in TBD.

14. Remove protective cover and plunger space from Syringe.

15. √Shut-off valve on Syringe - Close

16. Connect Syringe to syringe-pump.

> NOTE
> Press Syringe to confirm that syringe connection is tight and no leaks occur.

17. OPEN SHUT-OFF VALVE ON SYRINGE
    Turn valve parallel to flow direction.

18. Press on plunger for three seconds.
    √No leaks at connection

19. Pivot Sample Syringe through access opening on syringe-pump.

> NOTE
> For ground prepared test samples, secure syringe protective cover to Velcro.

20. Close sample syringe-pump access area.
    Turn door fastener ↷.

:00:00 21. Press <ENTER> to initiate analysis.
    Wait for one minute to check for Error Messages.
    If Error Message, see TOCA Cue Cards.

:30:00 22. √Analysis is completed
    √Data shows on display

23. Note sample number, time, date of analysis, and results of total organic carbon (TOC), total inorganic carbon (TIC), total carbon (TC), pH, and conductivity (COND) from display.

    Record this information in TOC Log Book.

24. Open sample syringe-pump access area.
    Turn door fastener ↶.

25. Turn syringe plunger ↶↷ for 60° (toward user).

26. CLOSE SHUT-OFF VALVE ON SYRINGE
    Turn valve perpendicular to flow direction.

27. Disassemble Luer Lock fitting.
    Disconnect Syringe from syringe-pump.

28. Attach protective cover to female fitting connection of Syringe.

29. Stow in TOC Supply Kit
    Stow TOC Water Sample Syringe in a Ziploc Bag.
    Place Bag in Subpack and into Kit.
    Stow TOC Test Sample Syringe in a Ziploc Bag.
    Place Bag into Kit.

30. Repeat steps 14 --- 29 for both Calibration Syringes A and B.

31. Close door.
    Turn fastener on TOC door ↷.

TOC — POWER switch → Off
Front Panel — J8 switch → Off
PUP-A — DC8
Power cable ←|→ ISS electrical connector
Detach power cable from front panel.
Power cable in TBD.

32. Stow:
    TOC Analyzer
    TOC Supply Kit

33. Report to **MCC**: date, time of sample collection, and analysis results for each of the two calibration samples.

WMK - IN-FLIGHT WATER PROCESSING

NOTE
Perform within six hours of collection.

1. Unstow from WMK and tmpry stow on the outside of the kit:
   MCDs (two) - one total count and one coliform
   Air Filter Adapter Assembly with Air Filter Adapters (AFA) in sterile packages
   Syringe Pump
   Micro sample In-flight Analysis Bag
   Large Waste Water Bag

2. Remove cap from Large Waste Water Bag.

3. Connect Large Waste Water Bag to Syringe Pump connection (with yellow dot) by twisting and tmpry stow on Kit.

NOTE
To prevent contamination, do not touch connector ends on MCD or AFA.

4. Retrieve both MCDs.

5. Label both MCDs with the date of sample collection and circle the sampling location (hot, cold, SVO-ZV) using Sharpie Pen.
   Tmpry stow the coliform MCD.

6. Remove the red cap from the MCD labeled total count.

7. Connect the MCD to the Syringe Pump connection (red dot to red dot).

NOTE
Use the same AFA for total count MCD and coliform MCD processing.

8. Remove the Air Filter Adapter (AFA) from the Air Filter Adapter Assembly package.

NOTE
Handling of AFA exterior does not require aseptic technique.

9. Check that AFA handle is perpendicular to the long axis of the adapter.

10. Remove sterile AFA from protective covering and discard the covering.

11. Remove the blue cap from the MCD and attach the MCD to the AFA (blue to blue).

12. Unstow the Water Sample Bag.

13. Uncap the Water Sample Bag and attach Bag to the AFA connector making sure that all connections are hand tight (by slight twisting).

14. Turn AFA handle parallel to long axis of AFA.

NOTE
Syringe Pump is calibrated for a 10 mL volume on each push and release. MCD fills with water during pumping.

15. To ensure no air enters the MCD, elevate and squeeze the Water Sample Bag (to force the water through the AFA connector) while pushing and releasing the plunger of the Syringe. Pump ten times for a total volume of 100 mL.

    Make sure the plunger of the Syringe Pump goes completely forward and back and confirm that MCD is filling with water.

16. Turn handle of the AFA perpendicular to long axis of AFA.

17. Push and release Syringe Pump a few times to remove all water from MCD into Large Waste Water Bag. Tap MCD several times to facilitate removal of residual water.

18. Disconnect MCD from Syringe Pump by holding the Syringe Pump and twisting the MCD.

19. Recap the MCD with red cap.

20. Disconnect MCD from AFA and recap the MCD with blue cap.
    Tmpry stow MCD.

21. With the MCD labeled “Coliform,” repeat steps 6, 7, 11, and 14 --- 20.

22. Disassemble AFA and the In-flight Water Sample Bag.
    Recap In-flight Water Sample Bag.

23. Stow the used AFA in AFA package for return to ground.
    Discard the In-flight Water Bag in wet trash.

NOTE
Unstow a sterile AFA for each source of water.

24. Repeat steps 1 --- 23 with each source of water.

25. Disconnect the Large Waste Water Bag from the Syringe Pump and recap.
    Tmpry stow Bag and use again until full.

26. When full, place the Large Waste Water Bag into a large Storage Bag (from WMK) and discard in wet trash.

WMK - FILLING MCD WITH GROWTH MEDIA

1. Remove Media Syringe Case from WMK.

2. Remove one total count and one coliform Media Syringe.
   Tmpry stow Media Syringe Case.

NOTE
Perform the following procedure for all the MCDs. Do not touch Media Syringe fitting after cap is removed. Do not use Media Syringe if media in syringe is cloudy or discolored.

3. Unstow the total count MCD.
   Remove the red cap.

4. Uncap the total count Media Syringe.
   Tmpry stow the cap.

5. Connect Media Syringe to the MCD and press tight to ensure good connection for fluid transfer.

6. Inject all fluid from syringe into the MCD.

7. Quickly open and close the blue cap of the MCD to release pressure.

8. Remove empty Media Syringe.
   Replace red cap on MCD.

9. Place inoculated MCD into a Biohazard Bag labeled MCDs.
   Tmpry stow.

10. Unstow syringe cap.
    Recap syringe.

11. Insert used syringe into Biohazard Bag labeled Media Syringes.
    Stow Biohazard Bag.

12. Repeat steps 2 --- 11 for coliform MCD using coliform Media Syringe.

13. Replace Media Syringe Case in Kit.

14. Place Biohazard Bag with MCDs in warm place (25 --- 37° C).

WMK - VISUAL ANALYSIS AND DIGITAL PHOTOGRAPHY

NOTE
Perform visual analysis and digital photography of MCD growth following 48 hours of incubation and again after 5 days (3 days after first analysis) of incubation.

1. Unstow Digital Camera.
   Charge Digital Camera.

2. Unstow Biohazard Bag with MCDs (from incubation location).
   Unstow data entry sheet and density chart from the kit.

3. Prepare the Camera.
   Use the macro lens.

4. Remove one MCD from Small Biohazard Bag.
   Stow Biohazard Bag.

5. Compare colony growth on MCD with water density chart.
   Record corresponding number on MCD label according to growth pattern or if time allows, count actual number of colonies.

6. Record information on data sheet.
   Tmpry stow data sheet in kit.

7. Photograph MCD results.

8. Replace MCD in Small Biohazard Bag labeled MCDs.

9. Repeat steps 4 --- 7 for each MCD.

10. √**MCC**

WMK - MCD DISPOSAL

1. Remove Biohazard Disposal Bag from Kit.

2. Place Small Biohazard Bag with MCDs into the Biohazard Disposal Bag to provide double containment.

3. Stow in Kit for return or dispose in biohazard waste.

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CORRECTIVE

CORRECTIVE

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MALFUNCTION

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TOCA - FUSE REPLACEMENT

TOC Supply Kit	1.	Unstow Fuse (one)
TOC Front Panel PUP-A	2.	√TOCA POWER switch - Off J8 switch → Off DC8
	3.	Turn black knob ↶ to unscrew.
	4.	Change out fuse.
	5.	Screw black turn knob ↷ to screw back in.
PUP-A TOC Front Panel	6.	J8 switch → On DC8 TOCA POWER switch → On
	7.	√Display power on If no power, go to TOC Cue Cards.

TOCA - DATA DOWNLOAD/DOWNLINK

TOC Supply Kit

1. Unstow
   TOCA Data Cable (RS232 cable)
2. Relocate MEC adjacent to TOCA.
3. TOCA Data Cable 9-pin connector →|← MEC serial port (9-pin male connector).
4. TOCA Data Cable 3-pin connector →|← TOCA RS-232 Port by aligning the red dot.

MEC PCS

5. Double click the 'CHeCS' Applications icon.
6. Double click the 'Total Organic Carbon Analyzer' icon.
7. Select 'Transfer' from the Main Menu.
8. Select 'Capture Text' from the Transfer Menu.
9. Name the file "CHeCS/toca/TOCA mm-dd-yy.txt" for downlink.
10. <u>ACTIVATE TOCA FOR DOWNLOADING</u>

TOC
√TOCA POWER switch - On

Front Panel
J8 switch → On

PUP-A
DC8

Power cable PUP ≠ 4428 →|← TOC Analyzer Connection marked "27.5 VDC"
Power cable PUP ≠ 4428 →|← PUP-A connector J8

√Display Orientation screen
Press <ENTER>

<u>NOTE</u>
If no screen, √plastic cover is closed.

Select [DOWNLOAD] (keys "↑" "↓").
Press <ENTER>

11. Press <ENTER> when ready.
12. Wait 2 --- 5 minutes for data to download.
13. When all data downloaded press <Exit>.
14. Answer "Yes" to disconnect.

TOC	15.	√TOCA POWER switch - Off
Front Panel		J8 switch → Off
PUP-A		DC8

Power cable PUP ≠ 4428 ←|→ TOC Analyzer Connection marked “27.5 VDC”
Power cable PUP ≠ 4428 ←|→ PUP-A connector J8

15. TOCA Data Cable ←|→ TOCA and from the MEC.

16. Stow

TOC Supply Kit	TOC Data Cable (RS-232 cable)

WMK - MALFUNCTION PROCEDURES

Malfunction	Correction
Syringe plunger cannot be engaged	Change out 3-way valve using Crescent Wrench to separate valve from syringe barrel.
Syringe is set to wrong volume (anything other than 12.5 ml)	Adjust Syringe by loosening knurled knob on syringe handle. Turn syringe handle to adjust plunger to correct setting. Tighten knurled knob and draw sample volume.
Adapter valve is set at wrong position	Check valve position. Turn valve to correct position according to procedures. Check MCD for rupture. Change, if ruptured.
Operator touches sterile surface of Adapter	Wipe affected area with Disinfectant Wipe. Write action taken on side of MCD.
Water leaks from Syringe Pump	Check all connections; press together. If leak continues, discontinue experiment.
Water leaks from MCD	Check MCD connections to Adapter and Syringe Pump; press together. If leak continues, start procedure over with another Microbial Filter.
MCD filter membrane ruptures	Discard MCD. Start procedure with another MCD.
Water does not evacuate from MCD	Continue pumping air through MCD. Use sharp movements of MCD to facilitate removal of residual water.
Incorrect volume of water filtered through MCD	Count number of strokes of Syringe Pump. Record event on side of MCD.
Cap is off Media Syringe. Media is cloudy or turbid.	Discard Media Syringe. Use another Media Syringe with cap and with clear media.
Blue cap on MCD is not removed to relieve pressure after removal or Media Syringe causing media spillover	Wipe excess media on outside of MCD with Dry Wipe or Towel. Record event on side of Microbial Filter.
Media injected into wrong side of MCD	Discard MCD. Start procedure with another MCD.